BOSTON MECHANIC,

AND

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SCIENCE AND YALE COLLEGE.

No one who has reflected upon the causes of national and commercial prosperity, can fail to observe how much they are indebted to the sciences. Commerce by sea, one of the main pillars of England's and this country's welfare, is wholly dependent for its success, upon the science which teaches the way across an interminable ocean. But without going beyond the limits of our own daily circle of objects, what do we see everywhere, but the results of scientific discoveries and operations? Every utensil of our daily use is indebted to science for the perfection which modern art has been enabled to give it. Let those who deny the utility or the advantage of these improvements and refinements of art and taste which surround us, go and take up their abode among the half civilized or barbarian tribes who, like them, do not yet perceive their value.

We proceed to give a short account of Yale College—which, says Mr. Woodbridge, in the Annals of Education, where we find the following facts, 'has contributed more, by the noble zeal of one of its professors, by the Journal of Science which he issues, and by the purchase of its cabinet of minerals, than any other institution in the country, to the diffusion of Natural Science.'

For some time after the authorities of the Colony of New Haven had resolved on the establishment of a College, they were induced to delay it by the remonstrances of the friends of Harvard College. In 1652, the subject was agitated, but again deferred, on account of the feeble state of the colony. In 1700, ten of the principal ministers of the Colony were

agreed upon, by general consent, to stand as trustees for the erection and government of a College. They assembled at New Haven, and instead of contenting themselves with the cheap, modern plan of forming a constitution, and appointing officers, each laid upon the table several folio volumes, amounting in the whole to forty, with the simple expression, '*I give these books for the founding of a College in this Colony.*'

In the following year, a charter was granted, a set of regulations formed, a rector appointed, and eight students received. The first commencement was held at Saybrook, in 1702. In 1716, the College was removed to New Haven.

The first college building was then erected, of wood, 170 feet in length, 20 in width, and three stories high, containing a dining hall, used as a chapel, a library, kitchen, and fifty rooms for students, at an expense of one thousand pounds sterling. The college buildings have now increased to seven, which are finely situated at the summit of the gentle slope which forms the public square, and contains the public buildings of New Haven. They furnish accommodations for about three hundred students. In 1718, the first commencement was held at New Haven, and thirteen graduates received the honors of the Institution. Liberal donations were received from friends of learning in England, among whom were Sir Isaac Newton, Sir Richard Steele, Burnet, Woodward, Halley, Bentley, Kennet, Berkley, Sherlock, Watts, and Doddridge. The most liberal donor was Governor Yale of the East India Company, and in acknowledgment of this aid, which enabled them to complete their building, the trustees gave his name to the infant institution.

In 1814, a Medical School was established, and a botanical garden commenced in the neighborhood. The increasing number of students, and the purchase of the splendid cabinet of Col. Gibbs, effected chiefly by the liberality of the citizens of New Haven, and the officers of the institution, led to the erection of a new and beautiful building for a dining hall, in the rear of those represented, with an upper story, devoted to this invaluable collection, the finest beyond debate in our own country, and yielding to few in Europe, in its extent and beauty.

Within a few years, the officers of this college have been led to take the first step towards the cultivation of a taste for the fine arts in a literary institution, by the offer of our historical painter, Col. Trumbull, to deposit, in the college, and ultimately bequeath for its use, the original sketches of his

principal pieces, and other historical paintings. The last building erected is that designed for this collection, the income from which, after the death of Col. Trumbull, is to be devoted to the support of indigent students.

At first, the care of the students devolved exclusively on the Rector, or President, and the studies were designed chiefly to prepare them for the clerical profession. Until 1770, the only new officers appointed, were a Professor of Divinity, and three tutors; and a Professor of Mathematics and Natural Philosophy, was the only one added until 1801. At that time, a Professor of Law was appointed; and in 1804, a Professor of Chemistry, and Mineralogy; and in 1805, a Professor of Languages.

The Faculty now consists of a President, six Professors, an assistant Professor of Chemistry, a Lecturer on Natural History, and eight tutors, to each of whom distinct studies are assigned; besides two other instructors in Modern Languages.

The progress of the institution in regard to its course of instruction has been great. Much more classical knowledge is now required for an admission to the lowest class, (and which of course is acquired in the preparatory grammar schools,) than was then given in the whole collegiate course. The course of instruction and the apparatus in Natural Philosophy have advanced with the science, and Rhetoric, Chemistry and Mineralogy, are added to the list of Professorships.

Connected with the College is a Law School with two Professors, a Theological School with two, and a Medical School with six. All these advantages have been obtained, and this progress made, by this College, with comparatively very limited funds. It appears that the whole amount of funds granted by the state has been less than colleges in other states have received in a single year; and at a very recent period, the whole income of the college, from its funds, did not much exceed two thousand dollars.

The plate at the commencement of this article, giving a view of the College buildings and the State House, originally appeared in the Peoples' Magazine, and subsequently, in the Annals of Education.

CONDITION OF THE TRADES IN GERMANY.

The different crafts in Germany are corporations recognized by law, governed by usages of great antiquity, with a fund to defray the corporate expenses, and in each considerable town, a house of entertainment is selected as the house of call or harbor, of each particular craft. Thus you see in German towns, a number of taverns, indicated by their signs—as the Masons' harbor, the Blacksmiths' harbor, &c. No one is allowed to set up as a master workman in any trade, unless he is admitted as a freemen, or member of the craft; and such is the stationary condition of most parts of Germany, that no person is admitted as a master workman in any trade, except to supply the place of some one deceased, or retired from business. When such a vacancy occurs, all those desirous of being permitted to fill it, present a piece of work, executed as well as they are able to do it, which is called their master-piece, being offered to obtain the place of a master workman. Nominally, the best workman gets the place; but it may easily be conceived that, in reality, some kind of favoritism must generally decide it. Thus every man is obliged to submit to all the chances of a popular election, whether he shall be allowed to work for his bread; and that too, in a country where the people are not permitted to have any agency in the choice of their rulers.

The restraints on journeymen, in that country, are still more oppressive. As soon as the years of apprenticeship have expired, the young mechanic is obliged to *wander*, in the phrase of the country, for three years. For this purpose, he is furnished, by the master under which he has served his apprenticeship, with a duly authenticated wandering book, with which he goes forth to seek employment. In whatever city he arrives, on presenting himself, with his credentials, at the house of call or harbor of the craft in which he has served his time, he is allowed, gratis, a day's food, and a night's lodging. If he wishes to get employment in that place, he is assisted in procuring it; if he does not wish to, or fails in the attempt, he must pursue his wandering; and this lasts three years, before he can be anywhere admitted as a master. —Everett.

PRESERVING METALS FROM CORROSION.

The attention of practical men is particularly directed to a consideration of the following remarks, taken from the New York Mechanics' Magazine. We wish the experiment tried, satisfactorily, that reason may be shown, if any there be, why iron, copper and brass may not be rendered as durable, and as free from corrosion, as gold and silver.

It was supposed by Sir Humphrey Davy, that instead of affinity being a distinct species of attraction, two substances had a tendency to unite only in consequence of their being in opposite states of electricity. This view of affinity suggested to Sir H. a matter of very great importance—a mode of preventing metals from being acted on by oxygen. The metals are electro-positive, and oxygen electro-negative: and this is the reason, according to Davy, of an affinity existing between them. Now, if by any means the metals can be retained in an electro-negative condition, they cannot suffer oxydation, or in common language, they cannot *rust*.

A very small quantity of zinc applied to any article composed of iron or steel, will completely prevent the action of oxygen upon it, whether exposed to air or water. All articles of cutlery whatever, all iron, steel or copper instruments used by mechanics, (excepting those which are exposed to fire,) all farming utensils—axes, hoes, sickles, scythes, ploughshares, chains, &c. &c., can be effectually prevented from 'rusting' by the application of a very small quantity of zinc, soldered to them in any place where it could be the most conveniently done. The expense of the zinc for this purpose is exceedingly trifling. 'A piece of zinc,' says Dr. Turner, 'as large as a pea, or the head of a small round nail, was found fully adequate to preserve 40 or 50 square inches of copper—and this wherever it was placed, whether at the top, bottom or middle of the sheet of copper, or under whatever form it was used.'

This brilliant discovery of Sir H. Davy, the result of his *Electro-Chemical Theory*, was first applied to the copper sheathings of ships, which are very expensive, and last but a short period, in consequence of their being constantly acted on by oxygen, and the hydro-chloric acid of sea-water. The application of this discovery to the preservation of instruments composed of iron or steel, was first suggested by Mr. Pepys; and delicate surgical instruments, which would be rendered useless were their cutting parts in the slightest

degree oxydized, are now kept perfectly bright by the application of zinc.

One objection has been made to the application of this principle to the preservation of the copper sheathings of ships, which is, that the copper, when effectually guarded by zinc against corrosion, becomes soon covered with marine plants and animals, which the oxyde and submuriate of copper, (formed on the surface of the sheathing previous to the application of the zinc,) completely prevented; and that the copper, being rendered electro-negative by the zinc, attracts substances in the opposite state contained in the sea-water, such as lime and magnesia. But neither the marine plants and animals, nor the lime and magnesia, are capable of injuring the copper; they only form a coating on its surface. When we compare the endurance of these difficulties, admitting that the above objections are well founded, with the short space of time that a copper bottom lasts, and the enormous expense of renewing the copper, they appear as nothing. Besides, it is the opinion of men of science, that by a skilful adjustment of the proportions of copper and zinc, or iron, which can be used instead of zinc on copper, these objections can be completely removed. However weighty these difficulties may be, they are confined solely to the application of zinc or iron to the copper sheathings of ships; they are not made to the application of zinc to metallic instruments.

One more advantage, and perhaps the greatest of all, arising from this discovery of Davy, is, that *iron* can be used instead of copper on the bottoms of ships, thus vastly reducing the expense of sheathing. The zinc as effectually prevents any chemical action on the iron as on the copper, and hence one is as good for the purpose as the other.

The numerous experiments which have been made by men of science since this discovery of Sir H. Davy, have fully established its value and importance, and it now remains for men to apply it to some useful purpose.

I am aware of no use having been made of this valuable discovery, except in the preservation of ships' bottoms and surgical instruments; and why, I ask, do not mechanics avail themselves of its advantages? It cannot, I think, be possible for any well informed mechanic to be ignorant of any of the facts above stated. If any one is, it must be his own fault. Books are cheap enough, and if any mechanic will say he cannot buy a few books on science, and that he has no time to study books if he had them, he is poor indeed, and leads a

slave's life. Such a man I sincerely pity. But what shall I say to those who *do* understand this principle—this discovery of Davy—who do not make some application of it? Go into the workshops of the different mechanics, and see their tools undergoing constant corrosion. Go to our wharves, and see all the iron work of ships covered with rust—their anchors and chain cables covered with oxyde. Go to the printing office, and see the press red with the oxyde of iron—the chases and composing sticks also covered with the same. Look at the steam-engine, the most ingenious, useful, and probably the greatest of all inventions, and think whether Sir Humphrey Davy's discovery could not be applied to that.

Wherein is the world benefitted by any discovery, if no application be made of it? To what purpose do we rack our brains in acquiring knowledge, if we make no use of it when obtained? People seem afraid to adopt anything new. Any new invention or discovery, if it be ingenious, they view with delight; but the thought does not seem to occur whether it can be applied to any useful purpose; and if any one attempts the application of a new principle, be it what it may, there are thousands ready to laugh at him, as they did at Fulton, in his exertions to show to the world the use and value of that machine of all machines—the Steam-Engine.

Ships are constantly building and being coppered without the least regard to this invaluable discovery; and why is it? Are ship-builders and ship-owners ignorant of the existence of this cheap and effectual preventive against the ravages of the elements, or have they tried it and found it ineffectual?

EDUCATION OF THE PEOPLE.

[Furnished for the Boston Mechanic.]

It is remarkable, that upon this subject,—the education of the laboring classes,—great and reflecting minds, in various ages, have written and thought just as those write and think who are now the advocates of this system. Neither is it less remarkable, that although the truth of such principles as are contained in the following extract, has been so often acknowledged, and what is more, so fully proved, by a few examples which the history of the world has from time to time presented,—the practical application of them has never been resorted to, by those who have had the power to do it,

for the rescue of degraded communities from the evils incident upon, and following in consequence of their degradation and ignorance. On the contrary, statesmen, and men in power, have preferred their own aggrandizement, even at the expense of a whole nation's suffering and misery, to endeavoring to benefit a people, by giving them sound and wholesome knowledge, which they fear, perhaps justly, might lead to the lessening of their own dignity and power. Here follows the extract above referred to:

'Some have objected to the instruction of the "*lower classes*," from an apprehension that it would lift them above their sphere, make them dissatisfied with their station in life, and by impairing the habits of subordination, endanger the tranquillity of the state; an objection surely devoid of all force and validity. It is not easy to conceive in what manner instructing men in their duties can prompt them to neglect those duties, or how that enlargement of reason which enables them to comprehend the true grounds of authority and the obligation of obedience, should indispose them to obey. The admirable mechanism of society, together with that subordination of ranks which is essential to its subsistence, is usually not an elaborate imposture, which the exercise of reason will detect and expose. This objection implies a reflection on the social order, equally impolitic, invidious and unjust. Nothing, in reality, renders legitimate governments so insecure as extreme ignorance in the people. It is this which yields them an easy prey to seduction, makes them the victims of prejudice and false alarms, and so ferocious withal, that their interference in the time of public commotion is more to be dreaded than the eruption of a volcano.'—Hall.

PRESERVING BRICK WALLS FROM DAMP.

[By J. I. Hawkins, Esq.—Loudon's Arch. Mag.]

In consequence of reading the excellent paper of Mr. Kent, I am induced to send you an account of the method I took to cure one or two of the evils against which he warns his readers.

Soon after I had taken a lease (ten years since) of the cottage I now occupy, I discovered that the damp ascended the walls to the height of a yard above the ground, and that my furniture began to be injured by mildew. Finding that the

foundation was laid upon a subsoil of clay, and knowing that a cure would be effected by interposing a water-proof medium throughout the thickness of the wall, just above the level of the ground, I proceeded in the following manner:

First, I made a hole through the wall, over the ground course, taking out two courses in height, and two bricks in length; consequently, the hole was six inches high, and eighteen inches wide. I filled up half this hole at one end, with two courses of sound bricks, laid in Roman cement. It is clear that the operation could not injure the wall, the width of eighteen inches not allowing of any settlement. Two courses more, of nine inches in width, were next removed, making the hole again eighteen inches wide, the half of which was then filled up with bricks and cement, as before. The operation was repeated until the whole of the walls of the house were underpinned by two courses of hard bricks, and three joints of Roman cement; constituting a water-proof septum, through which the damp cannot rise.

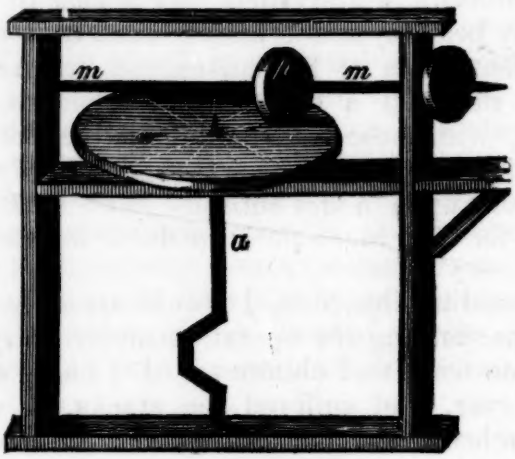
Local circumstances prevented easy access to two or three spots; and my bricklayer not taking care that there should be three perfect joints of Roman cement in every part, the moisture still rises, in a few neglected places, in a small degree. But, with these few exceptions, the cottage, generally speaking, has been as free from damp, for nearly ten years, as if built upon a dry subsoil. The cost of 120 feet run of wall, for the most part fourteen inches thick, was about £15.

In recommending this plan, I would strongly enforce the necessity of performing the operation under every part of the house, partition walls and chimneys. I yielded to the fears of my bricklayer, and suffered the stacks of chimneys to remain untouched; the hearths on the ground floors are therefore damp, except when a constant fire is kept up. There was in reality, no danger of any sinking of the stack, as Roman cement, when of good quality, expands in setting, and affords as perfect a support as the bricks and mortar which were taken away, or rather a more perfect support than they had afforded.

In building a house on a moist subsoil, where the expense of a water-proof foundation might be an object, a couple of courses of brick, laid in Roman cement, immediately above the level of the ground, would prevent the damp rising above those courses. I have seen a single course of slate used for this purpose with good effect; and that is, perhaps, as impervious to water as three joints of Roman cement.

Mr. Kent's just observations on the absorbing qualities of place bricks are applicable, also, in a considerable degree, to the inferior stocks of which my cottage is built. The outer walls above the first floor are only nine inches thick, and the driving rains used to force the wet quite through them, and through the plasterings, throwing off the papering of the rooms. I cured this evil by scraping off all the plastering inside the rooms, and replacing it by a coat of Roman cement; since which time, no symptoms of damp have appeared on the inside of these walls.

HORIZONTAL WHEEL LATHE.



The above cut represents a kind of lathe, described in the London Mechanics' Magazine. *W*, is a horizontal wheel, turning on the upright axis, or spindle *a; mm*, is the mandril, to which is attached the friction wheel, *p*, and by means of which it receives its motion from the large horizontal wheel.

The plan seems to be quite novel, and appears to possess some conveniences not attained in lathes of the common construction. The mandril is fitted with a friction roller, which works upon the upper surface of a large horizontal wheel, by which it is made to revolve.

The kind of power, or the method of applying it, are not stated in the account from which we have taken this sketch. The perpendicular spindle does not appear well adapted to the foot or treadle motion, usually employed.

By the shifting of the roller on the mandril, nearer to or farther from the centre of the horizontal wheel, all degrees of velocity may be obtained with great ease. The Magazine remarks as follows upon the adaptedness of this lathe to various operations:

'The position of the wheel offers facilities for giving independent motions to the cutting tools. Screws of every variety of thread may be cut by this arrangement. To do this, another friction roller must be applied, whose axis of adjustment is in the direction of the radius of the horizontal wheel. Let there be also a wrest, cut into a screw, fixed before the work, so as to revolve. Its head may be connected with the axis of the roller by a Hooke's universal joint, or by bevelled tooth wheels; and so every new adjustment of the roller will vary the velocity of the revolution of the screw wrest, and with it, that of the cutting tool, which it may be made to carry along with it. Many such independent friction rollers may be placed on different radii of the wheel, and so a multiplicity of various motions be generated, each separate motion itself being variable *ad infinitum*.'

'In case the mandril should spring, from its great length, or the surface of the wheel should do so, from the manner in which the pressure of the roller is applied, the double inconvenience would, it is thought, be remedied, by putting on the mandril another roller, and as far from the centre as the friction roller, *p*. This will equalize and balance the pressure on the surface of the wheel, and reduce the spring of the mandril almost to nothing.' These are the words of the Magazine: but though the spring may be undoubtedly remedied by a proper adjustment of friction bearings, we do not see what the effect of the second roller on the mandril is to be. If it is on the opposite side of the centre of the wheel, unless it is loose on the mandril, it will not go, for its tendency will be, to turn the mandril in the very opposite direction from the other friction roller; and though it may remedy the spring of the wheel, it does not appear so plain, how it should that of the mandril. A friction roller *under* the horizontal wheel would at least support that in its revolutions.

AMERICAN PATENTS.

[Abridged from the Journal of the Franklin Institute.]

PATENT *for a Machine for Moulding Bricks;* Granted to William C. Grimes, of York, in the county of York, Pennsylvania, December 2, 1834.

This machine is constructed upon the following general principles:—A wheel is affixed horizontally to, and revolves with an upright shaft, the latter being properly supported above and below by a suitable step and box, in which its gudgeons turn. The moulds in which the bricks are to be formed, are placed around and upon the face, or upper side of the wheel, near its periphery; these may stand in the direction of radii from the centre of the wheel or otherwise. Two or more moulds may be united or connected together. A hopper or trough, of sufficient capacity, is placed in an inclined position, with its lower end over one or more of the moulds at a time, as they pass under it. This hopper is to contain the tempered clay of which the bricks are to be made, and through that part of the bottom of it which projects over the mould or moulds, an opening or openings are made, of the length and width of a brick, through which the clay is to descend into the moulds. The motion of the wheels is not to be continuous, but intermitting. While it is at rest, a mould is immediately beneath the opening in the bottom of the hopper or trough, and the clay is then forced by a piston down into it; the piston then rises, and the wheel moves, and the moulds are thus filled in succession. As the filled moulds pass round upon the wheel, they are removed, and replaced by empty ones.

The moulds must be slightly attached to the face of the wheel, which may be done in various ways, the following being among the best:—From the under side of the moulds project two dowel pins, which fit into corresponding holes in the face of the wheel, by which means the moulds are kept from any lateral or horizontal movement. The dowel pins should be short, so that the moulds may be readily disengaged from the wheel.

Each frame of moulds has a thin plate or board, which is equal in length and breadth to its corresponding frame, and forms the bottom or bed of the moulds. The aforesaid dowel pins pass loosely through holes made for the purpose in this plate, the latter not being otherwise fastened to the moulds. Its use will be apparent to any one acquainted with the usual mode of moulding bricks.

PATENT *for a Machine for Pressing Bricks;* William C. Grimes, of York, York county, Pennsylvania, December 2.

This is performed in a manner analogous to the moulding, described in the preceding patent. A horizontal wheel is furnished round its circumference with moulds for pressing, forming mortises in the face of the wheel.

The bottoms of these moulds are not a fixed portion of the moulding wheel, but are the upper faces of movable pistons, that slide up and down in the moulds, as the wheel revolves. The lower ends of the piston rods or posts, slide round as the wheel revolves, upon a circular horizontal platform or rim, or rather upon two platforms, one half of the circle, or thereabouts, being elevated above the other about two or three inches. When the pistons rest upon this elevated portion of the circular rim or platform, their upper faces are flush with, or above the upper surface of the wheel; hence the bricks which have been pressed, being thus raised, can be removed with facility; while upon the opposite side of the wheel, the pistons upon the lower portion of the rim have their upper surfaces sunk down within the moulds, leaving cavities into which the bricks are dropped, as the pistons are depressed; the motion of the wheel, which is intermitting, not being too rapid for that purpose.

Just before the pistons rise on to the elevated portion of the circular rim, they pass under the short end of a strong iron lever, which projects over the face of the horizontal moulding wheel, far enough to cover the moulds as they pass under it.

While a brick is being pressed by the short end of the lever, the moulding wheel is at rest, as it receives its motion by a pall, or movable hand, that has a vibratory or reciprocating motion, which it receives from a crank fixed for that purpose, on the end of the fly-wheel shaft.

The moulding wheel, pistons, horizontal rim and fly-wheel, should consist of cast iron, and, in fact, the whole machine should be made of metal.

PATENT *for a mode or Machine for making Wrought Nails, Tacks or Spikes;* William C. Grimes, York, York county, Pennsylvania, December 17.

The nails &c., are not to be made from rods of the size of the body of the nail, but from broad plates, and these at a red heat. The plates are to be prepared by rolling, after the manner of plates for cut nails, but with this difference, they must be of perfectly sound iron, and two or three times as broad as the length of the intended nail, but of about the same thickness. These plates are to be cut off transversely into pieces, about two-thirds the length of two nails. From the sides of these pieces

or plates, the nails are to be formed and cut, the length of the nail running with the grain of the iron, or parallel with the length of the original plate. These plates are held, turned over, and the nails cut from the sides or ends of them, in the same manner as is practised in making cut nails, but with this difference,—in making cut nails, the plate is either cold, or at what is called a black heat, while in my process the plates are to be at a high red heat. In making cut nails, they are cut off with a regular taper from end to end; in this process, they are tapered not more than half their length. In making cut nails, the width of the plate is the length of the nail; in this process, the plate is cut into lengths transversely, which length forms two nails, by their points overlapping each other. In making cut nails, the first action upon the nail is to sever it from the plate; in this process, the nail is nearly formed before it is severed from the plate.

As the plates are cut at a high red heat, they would soon destroy the temper of the steel cutters or dies, if continually applied, as in making cut nails; therefore, to prevent such injury, I cut a few nails in rapid succession, and then allow a short intermission, when the plate is withdrawn, and a jet of water is applied for an instant to the dies, which continue in motion, the plate and the jet of water being applied alternately to them.

When the nail is to be formed and cut from the plate, such a portion of the latter as shall be necessary, is placed between the jaws or dies, constructed for the purpose, and which are parallel with the end, or edge of the plate, for about half or two-thirds of the length of the nail. The remainder of the dies are turned off at a slight angle, running out to the edge of the plate, thus forming the taper, or point of the nail; the plate is then turned over, and its opposite side brought into the same position between the jaws, and another nail is cut, the point of which commences at the same point in the plate at which the taper began in the preceding nail. A heavy hammer, for striking a head upon the nail, is placed in front of the end of the jaws.

PATENT *for Circular Tenter Bars, for the tentering and drying all kinds of Woollen and Cotton Goods;* Stephen R. Parkhurst, Providence, Providence county, Rhode Island, December 2.

The apparatus consists of two wheels on one shaft, capable of being placed at such distance apart as shall be equal to the width of the cloth. On the inner face of each wheel, a spiral of wood or metal, runs from the edge to the centre of the wheel, the threads of which are about 4½ inches apart. At distances of from 2 to 4½ inches, holes are bored through these spirals, through which pass iron pins, with heads on the outer, and hooks on the inner ends. As may be imagined, the cloth is to be wound

round in the spiral line between the wheels, being first attached near the shaft, and supported in the spiral line, by the hooks on the inner ends of the pins. The cloth is to be stretched properly, by a screw, which removes the wheels farther apart. Besides taking up very little room, this machine is described to have several other advantages, which will be understood and appreciated by fullers.

PATENT *for an improvement in Fireplaces and Stoves;* Elias W. Heaton, Middletown, Middlesex county, Connecticut, December 3.

The back of the stove or fireplace, against which the fire burns most intensely, is cast hollow, so that a space of two inches, more or less, between the plates, is water tight, having at the bottom of one end thereof, an orifice, closed with a stopper, for the purpose of cleaning the space. From the top to the opposite ends of the same space, extends a pipe, of suitable size and convenient length, which is connected with a boiler, containing water, the bottom of which stands on a level with the top of the furnace back.

The hollow back, we presume, is to contain water, to be drawn from the boiler. The claim is to the application of this contrivance to all kinds of stoves and fireplaces.

HISTORY OF LOWELL.

WE think that the following sketch, from the Lowell Journal, of the history of this celebrated manufacturing town, will be universally interesting.

ABOUT fifteen years ago the now territory of Lowell, being about four square miles, and bearing upon it about fifteen thousand inhabitants, was owned by a few honest farmers, who obtained subsistence for themselves and families by the cultivation of this comparatively barren spot, and the fish they caught in the Merrimack and Concord rivers. It comprised the northeasterly part of Chelmsford, and bounded easterly by the Concord river, which separated it from Tewksbury, and northerly by the Merrimack, that divided it from Dracut; and from the fact of its situation at the confluence of these rivers, was called Chelmsford Neck, and originally by the Indians, *Wamaset.*

Thus for centuries it lay, with the vast resources, which we now see developed, slumbering in its bosom, unsuspected and

unknown. But the spirit of enterprise and improvement came, and its touch, like that of the magic wand, has turned this seeming wilderness not simply into a fruitful field, but into a busy, enterprising and prosperous city.

In 1819, Kirk Boott, Esq., a wealthy merchant of Boston, in the habit of a hunter, explored this place. He discovered its resources, and immediately, in company with several other rich merchants of that city, purchased the land and water privileges. They were incorporated by the name of the 'Proprietors of the Locks and Canals on Merrimack river;' and commenced operations by digging a canal from the Merrimack river, near the Pawtucket Falls, easterly about one mile and a half, where it emptied into the Concord river. This canal is sixty feet wide, and carries in depth eight feet of water. This is their grand canal; lateral branches are cut, which carry the water to the several manufacturing mills, and then discharge it into the Merrimack or Concord rivers. They then erected a large brick machine shop, and commenced building machinery. This company sell out the privileges to manufacturing companies, dig the canals, erect the mills, build the machinery, and put the whole in operation; they do it cheaper than any body else would do it; and these are the only terms on which they sell the privileges. The company has a capital of $600,000, and employs constantly, about two hundred workmen in their machine shop. A part of their lands they have sold out to individuals at an enormous advance on the original price. Land for which they paid 20 or $30 per acre, they have sold for one dollar per square foot. They still have a considerable portion of it on hand and unsold. Kirk Boott, Esq. is their agent.

Lowell contains, as we have before remarked, about fifteen thousand inhabitants, and was incorporated in 1824 into a town district from Chelmsford, and received its name from Francis C. Lowell, Esq., who early introduced manufactures into this country. There are now about twenty-five factories in operation, and there yet remain unoccupied privileges for nearly as many more. When these shall be taken up, as they in all probability will, they will probably afford means of subsistence to another fifteen thousand of inhabitants, making in the whole thirty thousand.

A new canal is now being dug, which will furnish sites for about a dozen mills, of the size of those already built. A company has recently been incorporated by the name of the Boott Cotton Mills, which have purchased four of these sites, and upon them are immediately to erect four large brick

mills. The railroad from this place to Boston is now complete. It will be, we apprehend, of mutual advantage to both places, and especially to Lowell. It is said to be more permanently built than any other in the country. There are to be two tracks. They expect to travel the 25 miles in less than one hour and a half. It will greatly facilitate the immense transportation there must be between these places. A steamboat, owned by Messrs. Bradley and Simpson, is to commence running soon between Lowell and Nashua, a distance of 14 miles. It is to co-operate with the railroad. A spacious Market House, 166 feet long, is to be built this season —$40,000 have been appropriated for the purpose. Our town is deficient in public buildings. A town-house, school-houses and poor house, are all, we believe. Our streets are not paved, but will be ere long. And on the whole, notwithstanding its present imperfections and deficiencies, which time, we trust, will remedy, it yet presents, as we believe, much to interest the curious traveller.

NOTES ON GLASS.

We are principally indebted for the following notes, to the Mechanics' Assistant, a little work formerly published in New York, and containing much interesting information on mechanical subjects.

Discovery of Glass.—The following story in relation to the discovery of glass, is supposed to be correct. 'Accident is said to have discovered the constituent parts of glass. Some merchants with a freight of soda, cast anchor at the mouth of the river Belus, in Phœnicia, and were dressing their dinner on the sand, using large lumps of the soda as supports for their kettles. The fire melting the soda and the siliceous earth together, exhibited *glass*. A manufacture was immediately established, and to this place it was for a long time confined.'

Cutting Glass.—This is effected by a machine, in which there is a large wheel turned by a winch. The band of this wheel passes round a pulley on the axle of a wheel or cutter, which turns with great velocity. Beneath the cutter a cistern is placed, and above it a small cask containing water. The cock is so placed as to drop very slowly on the circumference of the cutter. The operator, after dressing the edge with

emery paste, applies successively the parts of the glass which are to be cut, and dexterously moves it as they are sufficiently ground away.

To cut Glass without cracking it.—Fill the vessel with oil to the place where it is intended to be cut. Immerse a red hot iron to an inch below this line; the heat will produce combustion, with evaporation, which will cut the vessel around the surface of the oil. Otherwise, mark with a file, the glass, around the place where it is to be divided, dip a string in spirits of turpentine, tie it round the mark, and then set it on fire, and the glass will crack along the line marked.—Jour. de Con. Usuel. and Silliman's Journal.

Coloring Glass.—Glass is colored by mixing with it metallic oxydes, while it is in a melted state. The following substances will give the different colors. For blue, oxyde of cobalt; green, oxyde of iron or copper; violet, oxyde of manganese; red, a mixture of the oxydes of iron and copper; purple, oxyde of gold; white, oxyde of arsenic and zinc; yellow, oxyde of silver, and combustible bodies; black, a mixture of oxyde of manganese, cobalt and iron. Opaque glass is made by the addition of the oxyde of tin.

To polish Plate Glass.—To polish the glass, it is laid on a large horizontal table of freestone, perfectly smooth; and then a smaller piece of glass, fastened to a plank of wood, is passed over the other till it has received its due degree of polish. But to facilitate this process, water and sand are used as in the polishing of marble; and lastly, Tripoli stone, smalt and emery, to give it lustre.

Spectacle Glasses.—Lenses and spectacle glasses are formed by polishing them in a kind of moulds, which are made of lead, and of the same form and degree of convexity as the glass is to be, only in the contrary direction, so that the convex glass is ground in a concave mould. Large lenses, for burning glasses, have sometimes been constructed, several feet in diameter. Nothing—neither stones nor the most infusible metals or refractory ores—can resist the concentrated heat thrown upon them by these immense instruments. But as the thickness of so large a glass must impede the passage of a considerable portion of light, concave mirrors are a preferable substitute for the glasses.

MECHANICS' HOURS OF LABOR.

[Original.]

EVERYTHING that tends to the intellectual improvement of the popular mind, and especially of the laboring classes, should be hailed as a harbinger of better days. For though, in the absence of those higher principles which enter into the heart, and rule the life, mere intellectual attainments cannot secure to a people true freedom or real happiness, yet no measure of virtuous principle—no degree of religious influence—can rescue a nation or a community from the fetters of ignorance and despotism, or preserve them from their degrading and paralyzing effects. We have reason to hope, that the discussion of the subject of mechanics' working hours, which is now going on, if conducted with proper reference to the rights of all parties interested, may end in the production of permanent good to the laboring community.

There seems to be ample reason for limiting the hours of obligated labor among mechanics, to ten. Experience has shown, that labor continued from day to day, for more than ten hours, is prejudicial to health. Those who live to a great age, we believe, have generally been temperate in all things—in food, in drink, in excitements, and in labor. That labor may be called temperate which does not take more from the system, than the succeeding night's sleep will perfectly restore. When more strength is put forth, during the day, than can be restored by our usual sleep, the constitution is injured. And generally, we believe, more than ten hours of hard labor will wear upon the human constitution, and exhibit its effects, if not in disease, at least, in premature old age and debility; although robust persons may, in many cases, endure much more without injury.

But not only is the body, but the mind itself, injured by excessive bodily labor. For whatever affects the body affects the mind also. Hence, were there no other motive for using the bodily strength moderately, but the preservation of a healthy and vigorous mind, that ought to be sufficient. But there are other motives. Not only the mind must be preserved in a healthy state, but it must be exercised and cultivated, and stored with useful information. Time is needed for intellectual cultivation, which is not easily obtained when the whole available portion of a day is devoted to labor. It is an acknowledged fault, that the laboring classes are not educated as they should be; and we will hazard the remark that those

who labor longest, and most severely, have generally a less perfect development of the mental powers than others. The mechanic needs these additional hours, for self-education—for obtaining useful knowledge of all kinds, and particularly in relation to his trade. It is not conceived that every one would avail himself of this opportunity, but it is very certain that many would, if they could obtain it. The education of the young mechanic during his apprenticeship, is full often little attended to, or even quite suspended. He has acquired, at most, the mere rudiments of an education, before entering his apprenticeship. He becomes acquainted with the world, and if he chances to meet with intelligent associates, he may gain considerable off-hand information, during this period of his life. But that he should possess himself of any of that scientific knowledge which a good mechanic, who is master of his trade, ought to have, is very improbable. Generally, to boys, and even to men, Philosophy, Chemistry, &c., have a forbidding aspect; and they frequently imagine, that, as for themselves, it would be impossible to learn them. But were sufficient time allowed them, to pursue these studies, their mistake would be far more likely to be discovered, and the advantages of these branches of knowledge would be more widely extended through the community at large.

It must be confessed, we dare not expect great results in this generation, except from a few minds already travelling forward, in the path of progressive improvement. Minds already matured cannot be so strongly influenced, even in the prosecution of good ends, as those which are young and tender. It is to the young, then, who are to arise in our places, that we look with greater confidence. They, we trust, will have a better understanding of the fact, that their talents are bestowed upon them for improvement, as well as their physical strength; and that it is as much a sin to neglect the one as the other.

FEW THINGS IMPOSSIBLE.

'It is impossible,' said some, when Peter the Great determined to set out on a voyage of discovery, through the cold northern regions of Siberia, and over immense deserts; but Peter was not to be discouraged, and the *thing was done.*

'It is impossible,' said many, when they heard of a scheme of the good Oberlin's. To benefit his people, he had determined to open a communication with the high road to Strasbourg, so that the productions of de la Roche, (his own village) might find a market. Rocks were to be blasted and conveyed to the banks of the river Bruche, in sufficient quantity to build a wall for a road along its banks, a mile and a half, and a bridge across it. He reasoned with his people, but they still thought it was impossible. But he seized a pick-axe, put it across his shoulder, proceeded to the spot, and went to work; and the peasants soon followed him with their tools. The road and bridge were at length built, and to this day, the bridge bears the name of the 'Bridge of Charity.'

'It is impossible,' said some, as they looked at the impenetrable forests which covered the ragged flanks and deep gorges of Mount Pilatus, in Switzerland, and hearkened to the daring plan of a man named Rupp, to convey the pines from the top of the mountain to the lake of Lucerne, a distance of nearly nine miles. Without being discouraged by their exclamations, he formed a slide or trough, of 24,000 pine trees, 6 feet broad, and from 3 to 6 feet deep; and this slide, which was completed in 1812, was kept moist. Its length was 44,000 English feet.

It had to be conducted over rocks, or along their sides, or over deep gorges, where it was sustained by scaffolds; and yet skill and perseverance overcame every obstacle, and the thing was done. The trees slid down from the mountain into the lake, with wonderful rapidity. The larger pines, which were 100 feet long, ran through the space of eight miles and a third, in about six minutes.

A gentlemen who saw this great work, says, that 'such was the speed with which a tree of the largest size passed any given point, that he could only strike it once with a stick as it rushed by, however quickly he attempted to repeat the blows.'

Say not hastily, then, of anything, 'it is impossible.' It may not be done in an hour, or a day, or a week; but perseverance will finally bring you to the end of it. 'Time and patience,' says a Spanish proverb, 'will turn a mulberry leaf into silk.'

MODE OF PRESERVING MILK.

[From the New York Mec. Magazine.]

PROVIDE a quantity of pint or quart bottles (new ones are perhaps best;) they must be perfectly sweet and clean, and very dry before they are made use of. Instead of drawing the milk from the cow into the pail as usual, it is to be milked into the bottles. As soon as any of them are filled sufficiently, they should be immediately well corked with the very best cork, in order to keep out the external air, and fastened tight with packthread or wire, as the corks in bottles which contain cider generally are. Then, on the bottom of an iron or copper boiler, spread a little straw; on that lay a row of the bottles filled with milk, with some straw between each, to prevent them from breaking, and so on alternately until the boiler has a sufficient quantity in; then fill it up with cold water. Heat the water gradually until it begins to boil, and as soon as that is perceivable, draw the fire. The bottles must remain undisturbed in the boiler until they are quite cool. Then take them out, and afterwards pack them in hampers, either with straw or sawdust, and stow them in the coolest place that can be found. Milk preserved in this way, has been taken to the West Indies and back, and at the end of that time was as sweet as when first drawn from the cow.

NOTES FOR AUGUST.

LISBON AQUEDUCT.—The magnificent aqueduct that furnishes the city of Lisbon with water, and which was cut off by the army of Don Miguel, may be regarded as one of the handsomest modern structures in Europe. From report, it will not yield in grandeur to any aqueduct left us by the ancients. That portion of it situated in the valley of Alcantara, about a mile from Lisbon, consists of thirty-five arches at least, by which a stream of the purest water is carried across a deep valley formed by two mountains. The height of the middle arch, from the base to the summit, is 263 feet 10 inches; the breadth of the principal arch is 107 feet 8 inches.

New Safety Lock.—A newly improved lock has been exhibiting at the City Hall, N. Y., the invention and manufacture of the Messrs. Campbell, leather dealers in Clinton Street. We understand that the inventors offer a reward of fifty dollars to any one who will unlock it. They intend to make one on a similar plan, somewhat more secure, and place it upon a trunk, depositing in the trunk one thousand dollars against any one willing to deposit a similar sum, the condition of the deposite to be that if in the course of a twelvemonth the lock is not opened by the most experienced lock picker that can be found, the whole sum shall be the property of the inventors; if the lock is opened, they forfeit the entire sum. The key belonging to the lock shall be given up to the person taking the offer, and the Messrs. Campbell will unlock the trunk every day during the year in his presence.

Glass Ships.—We sometimes see toy ships of glass in the shop windows; but this hardly paves the way for introducing glass vessels into actual service. An ingenious inventor, however, suggests the utility of using plated glass for sheathing ships, as a material not liable to corrosion, or to wear from the friction of the water. It is proposed to make the plates one inch, or an inch and a half in thickness, and one foot square; and to fasten them on with screws, through holes in the plates. This may answer, for all that we can see, very well; but the thickness of the plates, it is imagined, will make them a considerable of a load on the bottom of the ship.

Lead in Sugar.—The U. S. Gazette says, that portions of sugar, containing poisonous properties, have recently been imported into Philadelphia; and several instances have occurred within a few weeks, of sickness from its use. A respectable druggist was called upon recently with a sample, which, on examination, was found to contain acetate of lead, in proportion of one part in twelve of the sugar.

Correct Spelling.—The parts of Grammar are four, viz—orthography, etymology, syntax and prosody. Though mechanics, and matter-of-fact men are not expected to have much to do with the latter of these, they ought by no means to neglect the first. There are, nevertheless, words which almost every body misspells. Every chemist ought to know how to spell *oxyde*, and not write it *oxid*, and *oxyd*, and *oxide*, in which various ways it oftener appears than in its proper form. *Oxygen* also suffers occasionally, by the substitution of an *i* for the *y*. These positions we are ready to substantiate, although we have not room here to detail the proofs.

New Preparation of Hemp.—It has long been a great desideratum, to discover the means of extracting the glutinous matter from hemp, and to reduce the article to a fine fibre, suitable to the same purposes as flax. This object seems at last to be accomplished, in Great Britain. The machine for this purpose consists of two metal plates of a peculiar construction, supported by springs, to modulate the compression; and the hemp, in passing through (between?) these plates, undergoes a friction from their action, and after passing through several rollers, is freed from the glutinous matter, and of a soft and delicate fibre. The machine is moved by steam power, and the expense of this operation is said to be trifling. When it is considered that the price of hemp is only about half that of flax, and that the prepared hemp is equal, and for some purposes, superior to flax, the great usefulness of this machine must be manifest.

Invention of Steel Pens.—'The inventor of steel pens,' says the Journal of Commerce, 'is an American, and a well known resident of our city, (N. Y.) Mr. Peregrine Williamson. In the year 1800, Mr. W. then a working jeweller at Baltimore, while attending an evening school, finding some difficulty in making a pen to suit him, from a quill, made one of steel. It did not, however, work well, for want of flexibility. After a while, he made an additional slit on each side of the main cut. This remedied the difficulty; and the pens were so much approved, that Mr. Williamson was called upon to make them in such numbers as eventually to occupy his whole time and that of a journeyman. At first, the business was very profitable, and enabled Mr. W. to realize, for the labor of himself and his journeyman, a clear profit of six hundred dollars per month. The English soon borrowed the invention, and some of those who first engaged in the business realized immense fortunes.'

It is presumed that silver pens were known and in use long before this time.

Mechanic Apprentices' Library Association.—We have just received a neat pamphlet, containing an address delivered before this Society, in Boston, by one of its members, on the fourth of July, together with the Constitution of the Society. The address is worthy of the association; and the association is worthy of being aided by all the mechanic apprentices in the city of Boston, as we hope it will be. It gives them opportunities, if they will improve them, of cultivating their minds, and laying up valuable stores of information. The library is such as no apprentice can avail himself of anywhere else in New England.